WEEDS OF THE CRUCIFERAE (BRASSICACEAE) IN NORTH AMERICA[1]

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THERE ARE NUMEROUS definitions of weeds (see Harlan & deWet, 1965; King, 1966), and the number of taxa included below could be greatly altered depending on one's concept of a weed. It is not my intention to become embroiled with the different interpretations of weeds. Rather, my primary purpose is to delineate the alien members of the Cruciferae that have become weedy in North America and to give their accepted botanical names. Sometimes these weeds are pestiferous as far as man is concerned, sometimes not. Their importance is often associated with the effect they have in displacing native species in habitats where alien and native species are in competition. Secondarily, I have listed native species that have become weedy. Few, if any, of these have become pestiferous.

A complete, up-to-date listing of weed species of the Cruciferae is not available in one place, although if one had prior knowledge of those that are alien or weedy such a list could be extracted from Kartez and Kartez (1980). Weed names determined by a subcommittee on standardization of common and botanical names (Anonymous, 1966) include many entries from the Cruciferae, but the list is incomplete and the most acceptable nomenclature is not always followed. My objectives have been to provide a listing of the taxa by their authentic botanical names, to give synonymy where required for clarification of the accepted name, to provide notes on distribution and abundance, and to present miscellaneous notes that are deemed to be of interest. The genera are listed alphabetically, as are the infrageneric taxa under each genus. The chromosome number, when known, is given for each taxon, and the leading synonym, if there is one, is given in parentheses after the accepted name. Species considered to be noxious are marked with an asterisk.

Those native species of the Cruciferae that have weedy tendencies and by many criteria might be classed as weeds are given in the second part of the paper. Because of my special knowledge of the family as it occurs in North America, I have presented information in that section that is not available in the literature. None of the native species is in the category usually described as noxious. A few species approach this rating but fall short because they do not seriously interfere with farming or other plant cultural practices. In time, as happened in a much earlier period in the Old

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World, these native species may adapt better to the more open habitats provided by deforested and disturbed lands and may become weeds in the fullest sense of the word.

ALIEN WEEDS OF THE CRUCIFERAE

Alliaria petiolata (Bieb.) Cavara & Grande (*A. officinalis* Andrz.)—GARLIC MUSTARD. Annual or biennial. Near habitation, roadsides, waste places, alluvial woods, and fields; usually in shade or moist habitats. Quebec to British Columbia and Oregon; Kansas to North Carolina and northward. Native of Europe and Asia; old English garden plant. $n = 21$ (Easterly, 1963); $2n = 36$ (Mayor, 1934); $2n = 42$ (Jaretsky, 1932).

***Alyssum alyssoides** (L.) L.—PALE ALYSSUM. Annual or biennial. Roadsides, disturbed sandy or gravelly banks, waste places, overgrazed mountain meadows, and dry hillsides. Widely dispersed in North America, Newfoundland to Alaska, California to Virginia. Native of Europe and Asia. $n = 16$ (Mulligan, 1964); $2n = 32$ (Manton, 1932).

***Alyssum desertorum** Stapf. Annual. Open desert or semidesert and disturbed grassland, roadsides, and waste places. Southern Manitoba to Alberta; Washington to Nebraska. It has become abundant on sheep rangelands in the Rocky Mountain and Great Basin region. Native of eastern Europe and western Asia. $n = 16$ (Mulligan, 1964); $2n = 32$ (Ančev, 1975).

Alyssum minus (L.) Rothm. var. **micranthum** (Meyer) Dudley. Annual. Roadsides, waste places, foothills, and open rangeland. Western United States in limited areas, particularly in the Rocky Mountain and Great Basin region. Native of Eurasia.

Alyssum strigosum Banks & Solander. Annual. Disturbed areas. Sporadic in western Nevada and west-central California. Native of Eurasia.

Alyssum szowitsianum Fischer & Meyer. Annual. Disturbed areas in the foothills and canyons of the Wasatch Range, northern Utah. Native of Eurasia.

Arabidopsis thaliana (L.) Heynh.—THALE CRESS, MOUSE-EAR CRESS. Annual. Gardens, old fields, river bottoms, roadsides, and waste places. Abundant and widespread nearly throughout North America. Used in experimental physiology, biochemistry, and genetics. Native of Europe and Asia. $2n = 10$ (Mulligan, 1964).

***Armoracia rusticana** Gaertner, Meyer, & Scherb. (*A. lapathifolia* Gilib.)—HORSERADISH. Perennial. Escaped from cultivation; usually in moist habitats, roadsides, ditches, waste places, and persisting in old gardens; difficult to eradicate. Throughout temperate and northern North America. Native of Europe and Asia. $n = 14, 16$ (Easterly, 1963); $2n = 32$ (Manton, 1932).

Aubrietia deltoidea (L.) DC. Perennial. Escaped from cultivation. Known from only a few localities in the United States. One station, at the top of

Hull Mountain in the Mendocino National Forest of California, is remote from gardens and cultivated areas. Native of Europe.

Aurinia petraea (P. Ard.) Shur (*Alyssum petraeum* P. Ard.). Perennial. Escaped from cultivation; shade of cliffs, Oneida County, New York. Native of Europe.

Barbarea verna (Miller) Ascherson—EARLY WINTER CRESS, SCURVY GRASS. Biennial or perennial. Sometimes grown as a salad plant; escaped from cultivation and naturalized. Connecticut to British Columbia, California to Florida. Native of Eurasia. $2n = 16$ (Manton, 1932).

***Barbarea vulgaris** R. Br.—COMMON WINTER CRESS, YELLOW ROCKET. Biennial or perennial. Roadsides, pastures, fallow and cultivated fields, open woods, and waste places. Difficult to eradicate in some habitats. Reproduced both by seeds and cauline rosettes. Several varieties. Common throughout temperate North America. Native of Europe and Asia. $n = 8$ (Easterly, 1963); $2n = 16$ (Manton, 1932; Mulligan, 1959).

***Berteroa incana** (L.) DC.—HOARY ALYSSUM. Annual or biennial. Dry waste places, fields, meadows, roadsides, and dry stream bottoms. General but sporadic in temperate northern North America. Very abundant in some localities. Native of Europe. $n = 8$ (Jaretsky, 1928); $2n = 16$ (Manton, 1932; Mulligan, 1957).

Berteroa mutabilis (Vent.) DC.—HOARY ALYSSUM. Annual or biennial. Roadsides, fields, and waste places. Uncommon and local. Widely separated places in the United States. Native of Europe.

***Brassica campestris** L.—FIELD MUSTARD, BIRD'S RAPE. Annual or winter annual. Sometimes (particularly in an earlier period) grown as a salad plant; escaped from cultivation or introduced as a seed contaminant. Especially common in grain fields in certain areas, it occurs in other cultivated or fallow fields, orchards, gardens, roadsides, waste places, and disturbed areas. Common and widespread throughout temperate North America including the highland areas of Mexico and Central America. Native of Eurasia. $n = 10$ (Harberd, 1972); $2n = 20$ (Mulligan, 1959).

***Brassica elongata** Ehrh. Perennial. Recently found as a roadside weed in eastern Nevada. It has begun to penetrate the open desert from disturbed roadside sites. The Nevada plants belong to subsp. *integrifolia* (Boiss.) Breistr. Native of western Asia and eastern Europe. $n = 11$ (Harberd, 1972); $2n = 22$ (Manton, 1932).

***Brassica juncea** (L.) Czern.—CHINESE MUSTARD, INDIAN MUSTARD. Annual. Escaped from cultivation or introduced as a seed contaminant. Common in grain fields and other fallow or cultivated fields; roadsides and waste places. Widespread in temperate North America including the highlands of Mexico and Central America. Native of Asia. $n = 18$ (Harberd, 1972); $2n = 36$ (Mulligan, 1959).

Brassica napus L.—RAPE. Annual. Escaped from cultivation. Waste places.

Sporadic in temperate North America. Native of Eurasia. $n = 19$ (Harberd, 1972); $2n = 38$ (Howard, 1938).

***Brassica nigra** (L.) W. D. Koch—BLACK MUSTARD. Annual. Escaped from cultivation or introduced in fields as a seed contaminant. Common in fields, orchards, and gardens; roadsides and waste places. Especially common in the Central Valley of California, where it was apparently introduced by the early missionaries. Widespread in temperate North America including cultivated areas of Mexico and Central America; somewhat more sporadic in the more northerly areas of the continent. Native of Eurasia. $n = 8$ (Harberd, 1972); $2n = 16$ (Manton, 1932).

***Brassica rapa** L.—BIRD'S RAPE. Annual. Escaped from cultivation or introduced in fields as a seed contaminant. Cultivated fields and waste places. Temperate North America including the highland areas of Mexico and Central America. Native of Europe. $n = 10$ (Aryavand, 1977); $2n = 20$ (Mitsukuri, 1957).

***Brassica tournefortii** Gouan. Annual. Roadsides, waste places, old fields, and open desert. Locally abundant in the desert counties of southern California and southern Nevada, spreading eastward in Arizona and southward in Baja California. Native of the Mediterranean region. $n = 10$ (Sikka, 1940).

Bunias orientalis L. Biennial or perennial. Meadows and waste places; sporadic in widely separated areas. Temperate northern North America, Nova Scotia to British Columbia, northern United States. Native of Eurasia. $n = 7$ (Laane, 1971); $2n = 14$ (Hindakova & Cincura, 1967).

Bunias erucago L. Annual or biennial. Waste ground and old fields. Local in Pennsylvania and Virginia. Native of Europe.

Cakile maritima Scop.—SEA ROCKET. Annual. Dunes and strand. Naturalized along the west coast of North America from British Columbia to Baja California, sporadic along the east and gulf coasts. Native of Europe. $n = 9$ (Shive, 1969).

Calepina irregularis (Asso) Thell. Annual or biennial. Cultivated and fallow fields. Infrequent. Virginia and North Carolina. Native of Eurasia. $2n = 28$ (Larsen & Lagaard, 1971).

Camelina alyssum (Miller) Thell. (*C. dentata* (Willd.) Pers.)—FLAT-SEEDED FALSE FLAX. Annual. Fields and waste places. Infrequent in southern Canada. Native of Europe. $2n = 40$ (Manton, 1932).

***Camelina microcarpa** Andrz.—LITTLEPOD FALSE FLAX. Annual. Seed contaminant of flax and grain. Roadsides, cultivated fields (particularly grain and flax fields), meadows, open prairie, waste places. General in North America but most common in western Canada and northwestern United States. Native of Asia. $n = 8$ (Easterly, 1963); $2n = 40$ (Mulligan, 1957; Manton, 1932).

***Camelina sativa** (L.) Crantz—FALSE FLAX. Annual. Seed contaminant of flax and grain. Grain and flax fields, roadsides, meadows, waste places. General

in temperate northern North America but less common than *C. microcarpa*. Native of Eurasia. $2n = 28$ (Mayor, 1934); $2n = 40$ (Manton, 1932).

Capsella bursa-pastoris (L.) Medicus—SHEPHERD'S PURSE. Annual. Cultivated and waste areas, street and road margins, gardens and lawns, orchards and vineyards, coffee plantations, and pastures. Cosmopolitan in temperate North America including most populated areas of Mexico and Central America. One of the commonest, nearly worldwide weeds. Native of Europe. $n = 8, 16$ (Easterly, 1963); $n = 16$ (Aryavand, 1977); $2n = 32$ (Mulligan, 1957).

Capsella gracilis Gren. Annual. Cultivated or disturbed areas. Known at present only from Virginia. Native of Europe. There is a question as to whether this is a species or a hybrid involving *C. bursa-pastoris* and *C. rubella*.

Capsella rubella Reuter. Annual. Waste places. Infrequent in widely separated places. Labrador to Alaska, southeastern United States including Florida. Native of Eurasia. $2n = 16$ (Hill, 1927; Queiros, 1973).

Cardamine hirsuta L.—HOARY BITTER CRESS. Annual. Gardens, lawns, fields, waste places; usually in damp or wet soil. Sporadic in much of temperate North America but common and abundant in southern and southeastern United States, where it is a winter annual and invades untilled fields. Present but uncommon in Mexico. Native of Eurasia. $n = 8$ (Bell, 1965); $2n = 16$ (Rollins & Rüdenberg, 1977; Mulligan, 1965).

Cardamine impatiens L. Annual or biennial. Shady grasslands and disturbed moist sites. Sporadic and uncommon. New Hampshire to Michigan and West Virginia. Native of Europe. $2n = 16$ (Manton, 1932; Lövqvist, 1957).

Cardamine pratensis L.—CUCKOO FLOWER. Perennial. Escaped from cultivation, in wet meadows. The typical form that has given rise to the cultivated one, which is also weedy, is native to Europe and Asia. Native infraspecific taxa occur in northern United States south to Virginia and from Labrador across Canada to Alaska. $n = 15, 28$ (Hussein, 1955); $2n = 16, 30, 44, 56, 64, 72, 76, 80$, ca. 96 (Lövqvist, 1956).

***Cardaria chalepensis** (L.) Hand.-Mazz. (*C. draba* (L.) Desv. var. *repens* (Shrenk) Rollins)—LENS-PODDED HOARY CRESS, WHITE TOP. Perennial. Fields, ditches, roadsides, and pastures; favors saline soils, particularly in irrigated farmlands. Abundant in the irrigated districts of western Canada and western United States; less common and more sporadic elsewhere. Very difficult to eradicate and considered to be noxious by all standards. Native to western Asia and probably the Middle East. $2n = 80$ (Mulligan & Frankton, 1962).

***Cardaria draba** (L.) Desv.—HEART-PODDED HOARY CRESS, WHITE TOP. Perennial. Fields, ditches, pastures, roadsides, and waste places. Most abundant in irrigated areas where saline soils are prevalent. Common in western Canada and western United States; less common but sporadically present in most parts of temperate Canada, United States, and Mexico. Very difficult to eradicate, noxious. Hybridizes with *C. chalepensis*. Native of Eurasia. $2n = 64$ (Manton, 1932; Mulligan & Frankton, 1962).

Cardaria pubescens (C. A. Meyer) Jarmolenko (*Hymenophysa pubescens* C. A. Meyer)—GLOBE-PODDED HOARY CRESS, WHITE TOP. Perennial. Fields, ditches, pastures, roadsides, and waste places. Most abundant in irrigated areas where saline soils are prevalent; common but less abundant than the other species of *Cardaria* listed above. Western Canada and western United States. Sporadic elsewhere in North America. An aggressive, noxious weed that is difficult to eradicate. Native of central and western Asia. $n = 18$ (Hanelet, 1973); $2n = 16$ (Mulligan & Frankton, 1962).

Chorispora tenella (Pallas) DC.—BLUE MUSTARD. Annual or winter annual. Roadsides, fields, waste places, and open rangelands. Very abundant in the western plains states and the intermountain area of western United States to southern Canada. Sporadic elsewhere in temperate North America. Native of southwestern Asia and the Middle East. $n = 7$ (Rodman & Bhargava, 1976); $2n = 14$ (Jaretsky, 1929; Manton, 1932).

Conringia orientalis (L.) Dumort.—HARE'S-EAR MUSTARD. Annual or winter annual. Grain fields, cultivated lands, roadsides, waste places, and open, disturbed places. Most common in the plains and prairie provinces of Canada and the plains states of the United States but frequently found in or near cultivated land elsewhere in North America. It is sometimes found in remote places in the mountains where mining ghost towns or other disturbances provide suitable habitats. Native of Eurasia. $n = 7$ (Aryavand, 1977); $2n = 14$ (Jaretsky, 1928; Löve & Löve, 1956).

Coronopus didymus (L.) J. E. Sm.—SWINE CRESS, WART CRESS. Annual or winter annual. Gardens, old fields, roadsides, street margins, and other disturbed sites in cities and towns. Troublesome in gardens and nurseries. Widespread and locally abundant in much of the inhabited parts of North America, especially in the central, eastern, and extreme western parts of the continent; less common but present in Mexico and Central America. Native of Eurasia. Sometimes stated or inferred (Smith, 1952; Ball, 1964) to be a native of South America; this seems unlikely. $n = 16$ (Rollins & Rüdenberg, 1977); $2n = 32$ (Jaretsky, 1932; Manton, 1932; Heiser & Whitaker, 1948).

Coronopus squamatus (Forskål) Ascherson (*C. procumbens* Gilib.)—CREEPING WART CRESS. Biennial or perennial. Ballast and waste places. Local at San Francisco and Portland on the west coast and on port ballast at several locations in eastern North America. Recent collections infrequent. Native of Europe. $2n = 32$ (Jaretsky, 1932; Manton, 1932).

Crambe maritima L.—SEA KALE. Biennial or perennial. Nursery areas and cliffs at only a few locations on the west coast of North America. Recent collections not seen. $n = 30$ (Jaretsky, 1932); $2n = 60$ (Manton, 1932).

***Descurainia sophia** (L.) Webb—TANSY MUSTARD, FLIXWEED. Annual or winter annual. Abundant in disturbed waste places, cultivated fields, roadsides, canyon bottoms, and open, dry, heavily grazed rangelands. Throughout temperate North America. Native of Eurasia. $n = 14$ (Rodman, 1978); $2n = 20$ (Mayor, 1934); $2n = 28$ (Manton, 1932; Mulligan, 1961b).

Diplotaxis erucoides (L.) DC. Annual or biennial. Ballast and waste places near ports. Local at a few places on the east coast of North America. Native of Europe. $n = 7$ (Jaretsky, 1932).

***Diplotaxis muralis** (L.) DC.—SAND ROCKET, STINKING WALL ROCKET. Annual or biennial. Waste places, roadsides, abandoned land, heavily grazed grassland, beaches, and around buildings; locally abundant especially in irrigated areas. Widely scattered in Canada, the United States, and Mexico. Native of Europe. $n = 21$ (Harberd, 1972); $2n = 22$ (Jaretsky, 1932); $2n = 42$ (Löve & Löve, 1944; Ibarra & La Porte, 1947; Harberd & McArthur, 1972).

Diplotaxis tenuifolia (L.) DC.—SLIM-LEAF WALL ROCKET. Perennial. Wasteland near seaports, coastal areas, roadsides, and waste places inland. Sporadic from Nova Scotia to Ontario, southward in the United States, and from California to Virginia. Native of Europe. $2n = 22$ (Manton, 1932; Winge, 1925; Ibarra & La Porte, 1947; Mulligan, 1959; van Loon & de Jong, 1978).

Draba verna L. (*Erophila verna* (L.) Chev.)—WHITLOW GRASS, WHITLOW WORT. Annual or winter annual. Fields, lawns, open grassy hillsides and rangeland, waste places, usually where sand predominates. In some places millions of plants are present in a single population. Very common in many areas, sporadic in others, widely distributed in temperate North America. In most localities one of the earliest plants to flower in late winter or early spring. Native of Eurasia. $n = 8$ (Easterly, 1963); $n = 15$ (Mulligan, 1966); $2n = 19 + 1$ (Mulligan, 1966).

***Eruca vesicaria** (L.) Cav. subsp. **sativa** (Miller) Thell.—GARDEN ROCKET. Annual. Waste places and cultivated fields, roadsides, and open rangelands. Sporadic and local in many parts of the United States and Canada; especially abundant and widespread in central and highland southern Mexico. Native of Eurasia. $n = 11$ (Harberd, 1972); $2n = 22$ (Manton, 1932; Wills, 1966).

***Erucastrum gallicum** (Willd.) O. E. Schulz—DOG MUSTARD, ROCKET WEED. Annual or winter annual. Waste places, grain fields, roadsides, orchards, gardens, and railway yards. Common in some areas (e.g., the upper midwestern United States and south-central Canada); sporadic but widespread in other parts of temperate North America. Native of Eurasia. $n = 15$ (Harberd, 1972); $2n = 30$ (Manton, 1932; Mulligan, 1957).

***Erysimum cheiranthoides** L.—WORMSEED MUSTARD. Annual or winter annual. Common in grain fields, pastures, roadsides, sandy creek bottoms, and open hillsides; mainly on disturbed sites or where land is cultivated. Widespread throughout temperate North America including Alaska and the Yukon. Native of Eurasia. $n = 8$ (Jaretsky, 1928; Smith, 1938); $2n = 16$ (Manton, 1932; Mulligan, 1957; Rollins & Rüdenberg, 1977; Harriman, 1978).

Erysimum hieracifolium L.—TALL WORMSEED MUSTARD. Biennial or perennial. Becoming increasingly abundant in pasture land, waste places, and river flats, and on railroad and road embankments. Southern Canada from Nova Scotia to Saskatchewan but most common in eastern Ontario. Local in Wisconsin;

not known from elsewhere in North America. Native of Europe. $2n = 32$ (Tischler, 1934); $2n = 32, 48$ (Polatschek, 1966); $2n = 48$ (Jankun, 1965).

***Erysimum repandum** L.—TREACLE MUSTARD. Annual or winter annual. Roadsides, waste places, gardens, fields, gravel washes, and open rangelands of the cool desert and high plains. Common and widespread in temperate North America. Native of Eurasia. $n = 7$ (Aryavand, 1977); $n = 8$ (Mulligan, 1966); $n = 7, 14$ (Easterly, 1963); $2n = 14, 16$ (Manton, 1932; Polatschek, 1966); $2n = 16$ (Löve & Löve, 1956; Ančev, 1978).

Euclidium syriacum (L.) R. Br. Annual. Roadsides and waste places. Found at widely disparate places in the United States. Native of Eurasia. $2n = 14$ (Jaretsky, 1932).

Hesperis matronalis L.—DAME'S VIOLET. Biennial or perennial. Escaped from cultivation and now widely naturalized. Roadsides, rich moist woodlands, thickets, waste places, and old gardens. Much of temperate North America wherever it has been used as a garden plant. Native of Europe. $n = 8, 16, 24$ (Easterly, 1963); $2n = 24$ (Löve & Löve, 1956); $2n = 24, 28$ (Manton, 1932); $2n = 24, 26, 28$ (Dvořák, 1965).

***Hirschfeldia incana** (L.) Lagrèze-Fossat (*Brassica geniculata* (Desf.) J. Ball). Biennial or perennial. Disturbed moist soils, waste places, along roadsides and canyons, and in a few places in open desert. Oregon, southern Nevada, central and southern California. Native of the Mediterranean region. $n = 7$ (Mayor, 1934).

Hutera cheiranthos (Vill.) Gómez-Campo (*Rhyncosinapis cheiranthos* (Vill.) Dandy). Annual. Roadsides and ballast. Local in New Jersey, North Carolina, and Pennsylvania. Native of southern Europe. $2n = 48$ (Wright, 1936).

Iberis amara L.—WILD CANDYTUFT. Annual or biennial. Escaped from cultivation and only sparingly found in widely disparate localities. Native of Eurasia. $2n = 14$ (Manton, 1932; Bali & Tandon, 1957); $2n = 14, 16$ (Jaretsky, 1932); $2n = 18, 36$ (Bali & Tandon, 1959).

Ionopsidium acaule (Desf.) Reichenb.—DIAMOND FLOWER. Annual. Escaped from cultivation locally in northwestern California and western Oregon. Native of Portugal. $2n = 24$ (Chiarugi, 1928).

***Isatis tinctoria** L.—WOAD, DYER'S WOAD. Winter annual or biennial. Grain fields, orchards, pastures, waste places, and mountainsides. Rapidly spreading into rangelands and mountain pastureland in some areas. Abundant and widespread in western United States; less abundant but common at widely separated places elsewhere in North America. Native of Europe. $2n = 28$ (Jaretsky, 1932; Manton, 1932; Gadella & Kliphuis, 1970).

***Lepidium campestre** (L.) R. Br.—FIELD PEPPERGRASS, COW CRESS, POOR MAN'S PEPPER. Annual. Fields, pastures, meadows, gardens, yards, and waste places; often in grain fields. Widely distributed but sporadic in eastern North America; common and abundant in some areas of western United States and Canada.

Native of Eurasia. $n = 8$ (Easterly, 1963; Hill, 1978); $2n = 16$ (Mulligan, 1957, 1961a; Taylor & Mulligan, 1968).

Lepidium densiflorum Schrader—PEPPERGRASS, GREEN-FLOWERED PEPPERGRASS. Annual. Disturbed habitats, cultivated fields, roadsides, and dry, open soil of plains, prairies, and waste places. Abundant and widespread in the temperate parts of North America including the highland parts of Mexico. Apparently native in some parts of its range in western United States and Canada but said by many authors to be native of Asia and Europe. $n = 16$ (Jaretsky, 1932; Smith, 1938; Rollins, 1966); $2n = 32$ (Manton, 1932; Mulligan, 1957, 1961).

Lepidium heterophyllum (DC.) Bentham. Perennial. Roadsides and disturbed sites. Well-established as a local weed on Vancouver Island, British Columbia, Canada. $2n = 16$ (Manton, 1932; Mulligan, 1961a).

Lepidium latifolium L.—PERENNIAL PEPPERGRASS, BROAD-LEAVED PEPPERGRASS. Perennial. Beaches, tidal shores, wasteland, or somewhat saline irrigated land. Localized in widely separated places in Canada, United States, and Mexico. $2n = 24$ (Manton, 1932; Mulligan, 1957, 1961a; Heiser & Whitaker, 1948; Lessani & Chariat-Panahi, 1979).

Lepidium perfoliatum L.—SHIELD CRESS, CLASPING-LEAVED PEPPERGRASS. Annual. Common along roadsides, on overgrazed lands, edges of fields, grain fields, pastures, and waste ground. Widely distributed in temperate North America, particularly in the western part. Native of Eurasia. $n = 8$ (Jaretsky, 1932; Rollins, 1966); $2n = 16$ (Manton, 1932; Mulligan, 1957, 1961a).

Lepidium ruderale L.—ROADSIDE PEPPERGRASS. Biennial or winter annual. Roadsides, waste places, and old fields. Present in widely separated places, especially in eastern United States and Canada; sporadic elsewhere in North America. Native of Eurasia. $2n = 16$ (Kliphuis, 1977; van Loon & de Jong, 1978); $2n = 32$ (Manton, 1932; Tischler, 1934; Löve & Löve, 1956; Fritsch, 1973).

Lepidium sativum L.—GARDEN CRESS. Annual. Escaped from cultivation. Roadsides, waste places, and cultivated ground. Sporadic in widely separated places, probably in areas where it has been grown as a salad green. Native of Europe. $2n = 16$ (Reese, 1950; Mulligan, 1961a); $2n = 24$ (Vaarama, 1951).

Lobularia maritima (L.) Desv. (*Alyssum maritimum* (L.) Lam.)—SWEET ALYSSUM. Perennial. Escaped from gardens, where it is frequently used as an edging plant. Lawns, cultivated ground, and waste places; sporadic and not always persisting in a given location. Widely naturalized in North America. Native of Eurasia. $2n = 22$ (Borgen, 1969); $2n = 24$ (Larsen, 1955; Manton, 1932; van Loon & de Jong, 1978).

Lunaria rediviva L.—MONEY PLANT. Biennial or perennial. Escaped from cultivation. Waste places, streets, and roadsides; occasional in areas where

it is cultivated as a garden flower. Native of Europe. $n = 14$ (Delay, 1970); $2n = 28+$, 28 + 2B (Manton, 1932); $2n = 30$, 60 (Skalinska *et al.*, 1971).

***Malcolmia africana** (L.) R. Br. Annual. Common and abundant along highways, on disturbed areas, and open rangeland. Intermountain and Great Basin area from Arizona and Nevada northeast to southern Canada. Native to the Mediterranean region. $n = 14$ (Jaretsky, 1928; Bhat, Bakshi, & Kaul, 1974); $2n = 28$ (Manton, 1932).

Malcolmia graeca Boiss. & Spruner. Annual. Pastures and disturbed areas. Escaped from cultivation. Recorded only from Mexico. Native of Europe.

Matthiola bicornis (Sibth. & Sm.) DC.—EVENING STOCK. Annual or biennial. Escaped from gardens. Disturbed waste places; occasional and sporadic. Texas and California. Native of Eurasia.

Matthiola incana (L.) R. Br.—STOCK. Biennial or perennial. Escaped from gardens. Occasional along seacoast bluffs and waste places; usually not persisting in a given locality for long periods. Native of Europe. $n = 7$ (Gardé & Malheiros-Gardé, 1953); $2n = 14$ (Allen, 1924; Corner, 1927; Jaretsky, 1928; Ross & Miller, 1961).

Myagrum perfoliatum L. Annual. Fields and roadsides; uncommon. Apparently escaped from gardens. A few widely separated localities in Canada and the United States. Native of Europe.

Nasturtium officinale R. Br. (*Rorippa nasturtium-aquaticum* (L.) Hayek)—WATERCRESS. Perennial. Escaped from deliberate plantings in streams. In cool water in brooks, rills, springheads, and swamps. Throughout temperate North America, often in remote places in the mountains as well as nearer inhabited areas. Native of Eurasia. $n = 7$ (Easterly, 1963); $n = 16$ (Rodman & Bhargava, 1976; Rahn, 1966; Aryavand, 1977); $2n = 32$ (Jaretsky, 1932; Howard & Manton, 1946; Rollins & Rüdenberg, 1971); $2n = 32$, 48, 64 (Manton, 1932; Tischler, 1934).

Nasturtium microphyllum (Boenn.) Reichenb.—WATERCRESS. Perennial. Escaped from deliberate plantings in streams. In cool water in brooks, springheads, runs, and swamps. Mostly in eastern Canada and eastern to southeastern United States; sporadic elsewhere in temperate to cool areas. Native of Eurasia. $2n = 64$ (Mulligan, 1964).

***Neslia paniculata** (L.) Desv.—BALL MUSTARD. Annual. Often abundant; grain fields, waysides, waste places, and cultivated land. Nearly throughout Canada to Alaska, and from the northern plains to the eastern United States; sporadic elsewhere. Native of Eurasia. $n = 7$ (Jaretsky, 1928); $2n = 14$ (Manton, 1932; Mulligan, 1957; Taylor & Mulligan, 1968).

***Raphanus raphanistrum** L.—JOINTED CHARLOCK, WILD RADISH. Annual or winter annual. Cultivated fields, disturbed waste places, roadsides, orchards, and hillslopes. Widely distributed, especially in eastern North America and southward at high elevations; very abundant in parts of Mexico and Central

America. Native of Eurasia. $n = 9$ (Shive, 1969; Harberd, 1972); $2n = 18$ (Tischler, 1934; Rohweder, 1937; Löve & Löve, 1956; Mulligan, 1961b).

***Raphanus sativus** L.—RADISH, WILD RADISH. Annual. Common and abundant in grain fields, gardens, orchards, coffee plantations, and cultivated land generally; roadsides and waste places. Probably introduced from Eurasia as a seed contaminant as well as an escape from gardens. Widespread in temperate and cool parts of North America, including the highland areas of Mexico and Central America. Native of Eurasia. $n = 9$ (Harberd, 1972; Sato, 1955); $2n = 18$ (Manton, 1932; Morris & Richharia, 1937; Heiser & Whitaker, 1948; Sato, 1955).

Rapistrum rugosum (L.) All. Annual. Roadsides and waste places of cities and towns. Infrequently encountered at widely separated sites in Canada, Mexico, and the United States. Native of the Mediterranean region. $2n = 16$ (Manton, 1932).

Rapistrum perenne (L.) All. Perennial. Waste places. Apparently established in a limited area of southeastern Saskatchewan, Canada. Native of Europe.

Rorippa amphibia (L.) Besser. Perennial. Quiet waters and shores or moist, disturbed areas. Sporadic in eastern North America. Native of Eurasia. $2n = 16$ (Howard, 1947); $2n = 32$ (Wulff, 1939).

***Rorippa austriaca** (Crantz) Besser—AUSTRIAN FIELD CRESS. Perennial. Pastures, cropland, and waste areas, usually where moisture is plentiful. Widely scattered localities in Canada and the United States. Native of Europe. $2n = 16$ (Manton, 1932; Howard, 1947).

Rorippa indica (L.) Hiern var. **apetala** (DC.) Hochr. Annual or biennial. Waste ground and gardens. Limited to a few localities at widely separated places in the United States and Central America. Native of Southeast Asia.

***Rorippa sylvestris** (L.) Besser—YELLOW CRESS, CREEPING YELLOW CRESS. Perennial. Gardens, around ponds, along ditches and disturbed stream banks, in moist meadows, fields, and nurseries. Common in northeastern United States and adjacent Canada; sporadic elsewhere in North America. Native of Europe. $n = 16$ (Easterly, 1963; Naqschi & Javeid, 1976); $2n = 32$ (Manton, 1932); $2n = 32, 40, 48$ (Jonsell, 1964); $2n = 48$ (Howard, 1946, 1953; Löve & Löve, 1956; Gadella & Kliphuis, 1967; Rollins & Rüdenberg, 1977).

***Sinapis alba** L. (*Brassica hirta* Moench). Annual. Escaped from cultivation, fields, roadsides, and waste places; abundant in some localities. Widespread but sporadic in North America, including highland areas of Mexico and Central America. Native of Eurasia. $2n = 24$ (Yarnell, 1956).

***Sinapis arvensis** L. (*Brassica kaber* (L.) L. C. Wheeler)—WILD MUSTARD, CHARLOCK. Annual. Grain and flax fields, gardens, cultivated land generally, waste places, especially newly disturbed places including roadsides; common and abundant. Well known as a seed contaminant. Nearly throughout the temperate agricultural areas of North America, including the highlands of

Mexico and Central America. Native of Europe. $n = 9$ (Shive, 1969); $n = 8, 16$ (Easterly, 1963); $2n = 18$ (Yarnell, 1956).

***Sisymbrium altissimum** L.—TUMBLE MUSTARD, JIM HILL MUSTARD. Annual or winter annual. Fields, roadsides, waste places, railroad yards and rights-of-way, disturbed areas of prairies and high deserts; common and abundant. Throughout the temperate and arid parts of central and northern North America; sporadic southward in Mexico and beyond. Native of Eurasia. $n = 7$ (Easterly, 1963; Rollins, 1966; Rollins & Rüdenberg, 1977); $2n = 14$ (Manton, 1932; Smith, 1938; Mulligan, 1961b; Ančev, 1978).

***Sisymbrium irio** L.—LONDON ROCKET. Annual. Fields, orchards, roadsides, waste places, and open deserts. Often abundant in southwestern United States and Mexico; sporadic elsewhere, particularly northward. Native of Europe. $n = 7$ (Rollins & Rüdenberg, 1977; Aryavand, 1977); $n = 14$ (Amin, 1973); $2n = 14$ (Jaretsky, 1932); $2n = 14, 28, 42, 56$ (Khoshoo, 1955, 1957).

***Sisymbrium loeselii** L.—TALL HEDGE MUSTARD. Annual. Field margins, grain and fallow fields, roadsides, and waste places. Common and abundant in some areas of the plains region of Canada and the United States; sporadic elsewhere in widely separated localities of North America. Native of Eurasia. $2n = 14$ (Jaretsky, 1932; Mulligan, 1957).

***Sisymbrium officinale** (L.) Scop.—HEDGE MUSTARD. Annual. Roadsides, edges of fields, farmyards, gardens, and waste places; usually on disturbed sites, sometimes on open grazing land (especially in parts of Mexico); common and abundant in some areas. Most of temperate North America, but sporadic southward to Central America. Native of Europe. $n = 7$ (Easterly, 1963; Rollins & Rüdenberg, 1977); $2n = 14$ (Wulff, 1937; Rohweder, 1937; Heiser & Whitaker, 1948; Ančev, 1978; Taylor & Mulligan, 1968).

***Sisymbrium orientale** L. Annual. Street margins, roadsides, and waste places generally, but also invading disturbed, open desert areas. Nevada to central and southern California; sporadic elsewhere in southwestern United States and adjacent Mexico. Native of Mediterranean region. $n = 7$ (Rollins, 1966); $2n = 14$ (Jaretsky, 1932; Diers, 1961; Ančev, 1978).

Sisymbrium polyceratium L. Annual. Roadsides and waste places; uncommon. Widely separated localities in the United States. Native of Eurasia.

Teesdalia nudicaulis (L.) R. Br. Annual or winter annual. Infrequent in sandy fields, lawns, roadsides, and other disturbed habitats. States of the eastern seaboard and in western Oregon, Washington, and British Columbia. Native of southern Europe and north Africa. $n = 18$ (Böcher & Larsen, 1958); $2n = 36$ (Manton, 1932; Jaretsky, 1932; Tischler, 1934; Rohweder, 1937; Gadella & Kliphuis, 1966).

***Thlaspi arvense** L.—STINKWEED, FRENCHWEED, FIELD PENNY CRESS. Annual or winter annual. Grain and hay fields, gardens, roadsides, and waste places; grazing land in some places and in some areas ascending lower reaches of mountains; common and abundant. Nearly throughout temperate North

America but seeming to avoid the hotter and more humid areas of Mexico and Central America. Native of Europe. $n = 7$ (Wiens & Halleck, 1962; Easterly, 1963; Pinkava *et al.*, 1974); $2n = 14$ (Manton, 1932; Löve & Löve, 1954; Mulligan, 1957; Ančev, 1976).

Thlaspi perfoliatum L.—PENNY CRESS. Annual. Roadsides, fields, and waste places; uncommon but sometimes locally abundant. Mostly in central and eastern United States and adjacent Canada; sporadic elsewhere in North America. Native of Europe. $2n = 42$ (Jaretsky, 1932; Ančev, 1978); $2n = 70$ (Jaretsky, 1932).

NATIVE TAXA OF THE CRUCIFERAE THAT HAVE BECOME WEEDY

Most of the native cruciferous weeds do not have common names. In some books common names have been coined for these plants, but they are not common names in the sense that they are generally used by nonprofessional botanists, horticulturists, or agronomists.

Arabis glabra (L.) Bernh. (*Turritis glabra* L.)—TOWER MUSTARD. Biennial. Roadsides, banks, open woods, fields, lake and stream margins, cliffs and rocky places, often on disturbed sites; in the mountains as well as at lower elevations; common and often abundant. Eastern United States and Canada to California, north to British Columbia; less common or absent in the plains region. According to some authors (e.g., Rydberg, 1917, 1923), this species is a native of Europe and is wholly naturalized in North America. However, this seems not to be the case. *Arabis glabra*, although weedy in many places, is truly at home as part of the natural vegetation at a very large number of stations. It is probable that both native and Old World populations have contributed to the weedy populations now present in North America. The fact that there is an undoubtedly native taxon (*A. glabra* var. *furcatipilis* Hopkins, found in Utah and California) supports the conclusion that *A. glabra* var. *glabra* is indigenous to North America, as well as to Europe and Asia. $n = 16$ (Taylor & Mulligan, 1968; Rodman & Bhargava, 1976); $2n = 12$ (Titz, 1967); $2n = 16, 32$ (Hara, 1952).

Athysanus pusillus (Hooker) Greene. Annual. Inconspicuous but abundant in overgrazed pastureland, orchards, hillsides, and disturbed places; usually avoids truly cultivated land. Common in the inner Coast Ranges of California; from Idaho to British Columbia and southern California. Native of western United States and Canada.

Cakile edentula (Bigelow) Hooker—SEA ROCKET. Annual. Strand plants introduced from the east coast of North America to the shores of the Great Lakes and to the sandy beaches of the Pacific Ocean along the west coast; also in Australia, New Zealand, and the Azores. Gradually being displaced in some areas by *Cakile maritima*. Native of the east coast of North America from Labrador to Virginia. $2n = 18$ (Kruckeberg, 1948; Mulligan, 1964; Taylor & Mulligan, 1968).

Cardamine parviflora L. var. **arenicola** (Britton) O. E. Schulz. Annual. Shady brooks and woods, pastures, wet meadows, roadsides, and fallow fields, spreading locally to fields and roadsides. Quebec to Florida and northwestward from Louisiana and Texas to British Columbia; least common and sporadic west of Minnesota (the populations found may be introductions from its more easterly range, where it is often abundant).

Caulanthus lasiophyllus (Hooker & Arnott) Payson (*Microsisymbrium lasiophyllum* (Hooker & Arnott) O. E. Schulz). Annual. Abundant in open desert (usually in shade of bushes), pastures, roadsides, wasteland, and other disturbed places. Utah to Arizona, west to Baja California, and north to southwestern Washington; probably introduced northward from California, where it is very common in the central and coastal valleys. $n = 14$ (Rollins, 1966; Rollins & Rüdenberg, 1979).

Descurainia impatiens (Cham. & Schlecht.) O. E. Schulz. Annual. Disturbed places and cultivated lands; often abundant. Central and southern Mexico. Native of Mexico.

Descurainia pinnata (Walter) Britton—TANSY MUSTARD. Annual. Roadsides, fallow fields, dry sandy soils on hillsides, prairie, desert plains, open woodland, and waste places; abundant and common. Its several subspecies and varieties are widely distributed in Canada and the United States; less common southward in Mexico and beyond. Native of North America. Present range undoubtedly much wider than its original distribution. $n = 7$ (Rollins & Rüdenberg, 1977).

Descurainia richardsonii (Sweet) O. E. Schulz—GRAY TANSY MUSTARD. Annual. Calcareous gravels, open sandy woodlands, prairies, plains, fields, and waste places; abundant and common. The species, including its subspecies and varieties, most frequently found in central and western North America from Alaska to Mexico; sporadic elsewhere. Native of North America. $n = 7$ (Rodman, 1978); $2n = 14$ (Mulligan, 1961b); $2n = 14, 28, 42$ (Baldwin & Campbell, 1940).

Descurainia virletii (Fourn.) O. E. Schulz. Annual. Disturbed places and cultivated areas; abundant and common. Central highlands of Mexico. Native of Mexico. $n = 14$ (Rollins & Rüdenberg, 1977).

Draba brachycarpa Nutt. Annual or winter annual. Lawns, roadsides, pastures, fallow fields, and disturbed places. Abundant and common in central and southern United States; adventive and sporadic in areas outside of its natural range. Native of south-central United States. $n = 8$ (Smith, 1969); $2n = 24$ (Rollins & Rüdenberg, 1971).

Draba cuneifolia Nutt. Annual or winter annual. Prairie pastures, lawns, fallow fields, sandy disturbed soils, and waste places; abundant and common. Southern and southwestern United States and adjacent Mexico. Native of southwestern North America. $n = 16$ (Rollins & Rüdenberg, 1971).

Draba nemorosa L. Annual or winter annual. Open woods, pastures, lawns, fallow fields, roadsides, and disturbed places; abundant and common in some

areas. Central and northern North America; sporadic and often adventive elsewhere, particularly eastern United States and Canada. Native of North America.

Draba reptans (Lam.) Fern. Annual. Open sandy areas, roadsides, pastures, and disturbed places; common in some parts of its range where it has become weedy, sporadic in other parts. Eastern and central United States and westward to Washington, Oregon, and northern California. Native of North America.

Erysimum inconspicuum (S. Watson) MacM. Perennial. Roadsides, field-margins, disturbed areas generally. Widely distributed in central, west-central, and northern North America; adventive eastward and southward. Native of present range, but its geographic distribution is much wider now than before the advent of agriculture in the region of its occurrence. $n = 27$, $2n = 54$, 162 (Mulligan, 1966).

Leavenworthia uniflora (Michaux) Britton. Annual. Fields and roadsides, usually in cedar glade areas; exceedingly abundant. Kentucky and Ohio to Alabama and Missouri. Although native to most of its present range, the plants have moved from their original habitats. $n = 15$ (Rollins, 1963); $2n = 30$ (Baldwin, 1945). Other species (*L. alabamica* Rollins, *L. crassa* Rollins, *L. exigua* Rollins, *L. stylosa* A. Gray, and *L. torulosa* A. Gray) are in fields and pastures as well as cedar glades. Cornfields in low places where moisture persists in the spring are often completely covered with *Leavenworthia* plants. These manage to produce viable seed before tilling is possible, thus assuring a new population each year.

Lepidium. Most of the native annual species of *Lepidium* become weedy under certain circumstances, and some species, such as *L. lasiocarpum* Nutt. and *L. ramosissimum* A. Nelson, are weedy nearly throughout their ranges. With these, it is now impossible to determine their exact indigenous boundaries because of the ease with which they move from one area to another. The most common and widely distributed native annual is *L. virginicum* L.

Lepidium virginicum L.—POOR MAN'S PEPPERGRASS, PEPPERGRASS, VIRGINIA PEPPERGRASS. Annual or winter annual. Fields, meadows, pastures, open rangeland, roadsides, and waste places; particularly on disturbed sites. Common and widespread nearly throughout North America. There are a number of recognized infraspecific taxa. Although a native of North America, *L. virginicum* has been widely introduced to other continents. $n = 8$, 16 (Easterly, 1963); $2n = 32$ (Smith, 1938; Mulligan, 1961a; Rollins & Rüdenberg, 1971).

Lesquerella. The annual species are often abundant where they occur, and some of these definitely have weedy tendencies. The most notable are: 1) *Lesquerella densipila* Rollins. This species often occupies entire fields in central Tennessee and is along roadsides in northern Alabama; it has apparently spread from Tennessee to Alabama. 2) *Lesquerella gracilis* (Hooker) S. Watson. Grain fields, railroad rights-of-way, and sandy roadsides. Native in central and east-central Texas; adventive in Illinois, Missouri, Mississippi, and Tennessee. 3) *Lesquerella gordonii* (A. Gray) S. Watson. Abundant in open

disturbed areas and along roadsides. Kansas, Oklahoma, and Texas west to western Arizona. 4) *Lesquerella lasiocarpa* (Hooker) S. Watson. Open disturbed areas and along roadsides. Southwestern Texas and adjacent Mexico. 5) *Lesquerella lescurii* (A. Gray) S. Watson. Old fields, river bottoms, and roadsides. Central Tennessee.

Rorippa. The native annual species show weedy tendencies, and at least one perennial, *R. sinuata* (Nutt.) A. S. Hitchc., is a roadside and field weed in some places, usually in sandy soils. So far it is not known to be noxious even though the plants spread by underground rhizomes. Moist places, such as the banks of streams or irrigation ditches, are favorite habitats. *Rorippa curvipes* Greene, an annual that is abundant in the Rocky Mountain region of the western United States, occurs sporadically eastward as a weed, with at least one locality in Michigan. $2n = 16$ (Rollins, 1961). *Rorippa palustris* (L.) Besser is a widespread annual. As a weed it occurs in open disturbed areas, along roadsides, on field-margins, and in waste places, usually in moist to wet soils. $2n = 32$ (Jørgensen, Sørensen, & Westergaard, 1958; Mulligan, 1964). *Rorippa palustris* var. *palustris* is native to Europe and perhaps also to some areas of eastern United States and Canada. As a weed it is also introduced outside its native range, either from Europe or from native populations. Populations of most of the subspecies and varieties of *R. palustris* occur as weeds nearly throughout the United States and the southern half of Canada; many of these are outside the presumed natural geographic range of the species. $2n = 32$ (Löve & Löve, 1975). Other annual species, such as *R. sessiliflora* (Nutt.) A. S. Hitchc., $2n = 16$ (Jonsell, 1968), and *R. teres* (Michaux) Stuckey, which are found primarily in the central and southern United States, also have weedy tendencies. They often occupy open disturbed sites, roadsides, pastures, and cultivated land. Although the degree to which they have moved outside of their original geographic pattern of occurrence is difficult to determine, it is almost certain that many weedy populations now in existence have come into being since man disturbed the original vegetational cover.

Sibara virginica (L.) Rollins. Annual. Abundant in old fields, clearings, roadsides, pastures, and other open areas. Distributed from the Atlantic coast to central Texas, and then disjunct to southern California. In the vegetative state this species is often confused with *Cardamine hirsuta* L. The two grow together in many places. $n = 8$ (Rollins & Rüdenberg, 1977); $2n = 16$ (Rollins, 1966).

Streptanthella longirostris (S. Watson) Rydb. Annual. Abundant along sandy roadsides and on disturbed sites elsewhere, also in open desert. Southwestern Wyoming to New Mexico, westward to California and Baja California. It is doubtful whether this species exceeds its native range, but its great abundance in disturbed sites definitely shows its weedy tendencies.

Tropidocarpum gracile Hooker—DOBIE POD. Annual. Grassy slopes, open swales, field-margins, roadside slopes, open chapparal, and open desert. This species has weedy tendencies but seems to avoid cultivated fields. The plants

are often so dense that they form a tangled mass. Very abundant in the southern inner Coast Ranges of California, where it is sometimes the dominant herb; also in southern California and northward from the Central Valley. Native of California. $n = 8$ (Rollins, 1966; Rollins & Rüdenberg, 1979).

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